

TECHNICAL REVIEW DOCUMENT
For
MODIFICATION TO OPERATING PERMIT 95OPAR037

Colorado Interstate Gas Company – Latigo Compressor Station
Arapahoe County
Source ID 0050055

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Revised May, September and October 2006

Revised December 13, 2006 based on comments received during the public comment
period

I. Purpose:

This document establishes the decisions made regarding the requested modifications to the Operating Permit for the Latigo Compressor Station. This document provides information describing the type of modification and the changes made to the permit as requested by the source and the changes made due to the Division's analysis. This document is designed for reference during review of the proposed permit by EPA and for future reference by the Division to aid in any additional permit modifications at this facility. The conclusions made in this report are based on the information provided in the original request for modification submitted to the Division on February 2, 2006, additional information submitted on July 5 and August 23, 2006, comments on the draft permit and technical review document submitted on October 19, 2006, comments on the draft permit and technical review document received on December 6, 2006 during the public comment period, various e-mail correspondence and telephone conversations with the source. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised construction permit.

II. Description of Permit Modification Request/Modification Type

The renewal operating permit for the Latigo Compressor Station was issued on July 1, 2005. The source submitted a request on February 2, 2006 to appropriately correct the description of emission units E001 through E004 (reciprocating internal combustion

engines). These engines are identified in the current Title V permit application as 4-cycle rich burn engines and subject to the requirements in Colorado Regulation No. 7, Section XVI for rich burn reciprocating internal combustion engines. The application indicates that the lean burn designation is appropriate because the revisions to Regulation No.7 which were adopted in March 2004 (effective May 31, 2004) to address reciprocating internal combustion engines included a definition of lean burn engines (greater than 2% oxygen in the exhaust gas) and that the engines are always operating in lean burn mode (i.e. well above 2% oxygen in the exhaust). Colorado Regulation No. 7, Section XVI included provisions to exempt existing lean burn engines from control requirements if their owners and operators could demonstrate that the cost of controls would exceed \$ 5,000 per ton and that such demonstration must be submitted by May 1, 2005. The source submitted a request for such an exemption on April 29, 2005 and in an October 12, 2005 letter, the Division agreed that the exemption applied to engines E001 through E004.

Since emissions from these engines have been estimated in the past using AP-42 emission factors for 4-cycle rich burn engines, with this request to appropriately identify these engines as lean burn engines, the source is requesting the use of the appropriate AP-42 emission factors and an increase in permitted emissions for engines E001 through E003 (engine E004 is permit exempt). The change in emissions associated with this modification are shown in the below tables.

	Potential To Emit (tons/yr)			Emission Estimation Method
	NO _x	CO	VOC	
Engine E001 – E004, as Requested by this Mod.	581.2	78.9	16.8	AP-42, Section 3.2 (dated 7/00), Table 3.2-2, 4-cycle lean burn engines, NO _x at 90-105% load and CO at < 90% load.
Engines E001 – E004, in Current T5 Permit	317.1	519.6	4.15	AP-42, Section 3.2 (dated 7/00), Table 3.2-3, 4-cycle rich burn engines, NO _x at < 90% load and CO at 90-105% load
Change in Emissions	264.1	-440.7	12.65	

The facility potential to emit after this modification is as follows:

Emission Unit	Potential to Emit (tons/yr)			
	NO _x	CO	VOC	HAPS
Engine E001	149	20.2	4.3	See Table on Page 9
Engine E002	149	20.2	4.3	
Engine E003	149	20.2	4.3	
Engine E004	134.2	18.3	3.9	
Engine E005	29.8	48.9	0.4	
Engine E006	29.8	48.9	0.4	

Emission Unit	Potential to Emit (tons/yr)			
	NO _x	CO	VOC	HAPS
Dehydrator D001			9	See Table on Page 9
Fugitive VOC Emissions F001			6.4	
Condensate Truck Loading			5	
Total	640.8	176.7	38	24.41

In the above table, the criteria pollutant PTE is based on permit limitations for the dehydrator and fugitive VOCs from equipment leaks, requested emissions for engines E001 through E003, the appropriate emission factors, design rate and 8760 hrs/yr of operation for engines E004 through E006 and the APEN submitted on April 15, 2005 for condensate truck loading.

In the above table, the breakdown of HAP emissions by emission unit and individual HAP is provided on page 9 of this document. The HAP PTE is based on the Division's analysis. As indicated in the table footnotes on page 9, the HAP PTE was determined as follows: for the glycol dehydrator it is based on the permitted emissions, except that total HAPS are based on 13 tpy (although the total HAP limit is 14 tpy, total HAPS cannot exceed 13 tpy without violating permit limits); for fugitive VOC emissions it is based on permitted emissions and the weight percent of HAPS (as indicated in the wet gas analyses used in the GLYCalc runs for the dehydrator); and for the engines it is based on design rate, 8760 hrs per year of operation and the most conservative emission factor from AP-42 or HAPCalc 2.0. For engines E001 through E004, formaldehyde emissions are based on the emission factor determined from the July 2004 performance test. For the condensate tank loading it is based on the E & P Tanks run used to estimate emissions in a November 29, 2004 submittal by the source.

Colorado Regulation No. 3, Part C, Section X.A identifies those modifications that can be processed under the minor permit modification procedures. Specifically, minor permit modifications "are not otherwise required by the Division to be processed as a significant modification" (Colorado Regulation No. 3, Part C, Section X.A.6). The Division requires that "any change that causes a significant increase in emissions" be processed as a significant modification (Colorado Regulation No. 3, Part C, Section I.B.36.h.(i)). Since requested emissions for the modification are above the PSD significance levels, the Division considers that this modification shall be processed as a significant modification. It should be noted that the change in emissions is due a change in emission factors, not due to any modifications to equipment or new equipment. The emission factors more appropriately estimate emissions from the engine and provide a better indication of emissions at the facility.

III. Modeling

The requested modification will result in NO_x and VOC emission increases of 264.1 and 12.65 tons/yr, respectively and a significant decrease in CO emissions (440.7 tons/yr).

Modeling is not conducted for VOC emissions. The increase in NO_x emissions is well above the modeling threshold (40 tpy) in the Division's modeling guidance. A modeling analysis was not submitted with the February 2, 2006 application. In a April 25, 2006 e-mail, the Division notified that source that modeling was required for NO_x. The source submitted a modeling analysis on July 5, 2006, with a revised analysis submitted on August 23, 2006.

The impacts from the modified equipment (i.e. revised emissions due to different emission factors) were above the significant impact level, so a cumulative modeling analysis was required. Since there are no facilities within 5 km of the significant impact, the cumulative analysis included only the equipment at the Latigo facility. Since the impacts were close to the NAAQS, the Division requested that insignificant activities be included in the analysis. Based on the current stack parameters, the modeling analysis indicated potential violations of the NO₂ (75% conversion from NO_x to NO₂) standard. Therefore, the source has proposed raising the stack heights of engines CG-1 through CG-4 (E001 through E004) to 12 meters (~ 39 ft 4 in, currently stacks are 18 ft) and CG-6 and CG-7 (E005 and E006) to 10 meters (~ 32 ft, 9 in, currently stacks are 13 ft, 4 in). CIG has committed to complete the stack height increases by February 1, 2007. The Division has reviewed the modeling analysis and agrees that with the revised stack heights, the facility will not cause or contribute to a violation of the NAAQS and CAAQS. The impacts of the facility with the revised emission estimates requested in this modification, with the new stack heights, are as follows:

Pollutant	Averaging Time	Facility	Facility and Nearby Sources ¹	Background Concentration	Total Impact	NAAQS/CAAQS
NO ₂ *	Annual	59.3 µg/m ³	59.3 µg/m ³	22.6 µg/m ³	81.9 µg/m ³	100 µg/m ³

*75% conversion from NO_x to NO₂.

¹There are no other sources within 5 km of the facility.

The commitment to increase the stack heights will be included in the operating permit.

IV. Discussion of Modifications Made

Source Requested Modifications

The Division addressed the source's requested modifications as follows:

In their February 2, 2006 application, the source requested that the permit be revised to reflect that engines E001 through E004 are 4-cycle lean burn engines. The source has requested that AP-42 emission factors be used to estimate emissions. The new emission factors and the new potential to emit (at 8760 hrs/yr of operation) from these engines are shown on the following table:

	NO _x	CO	VOC	Emission Factor Source
New Emission Factors, in lb/MMBtu	4.08	0.557	0.118	AP-42, Section 3.2 (dated 7/00), Table 3.2-2, 4-cycle lean burn engines, NO _x at 90-105% load and CO at < 90% load.
Emissions (tons/yr) Predicted by New Emission Factors ¹	581.2	78.9	16.8	
Emission Factors in Current T5 Permit, lbs/MMBtu (E001 – E003)	2.27	3.72	0.0296	AP-42, Section 3.2 (dated 7/00), Table 3.2-3, 4-cycle rich burn engines, NO _x at < 90% load and CO at 90-105% load
Emission Factors in Current T5 Permit, g/hp-hr (E004)	7.7	12.7	0.1	AP-42, as indicated above, converted to g/hp-hr based on an engine heat rate of 7514 Bt/hp-hr
Emissions (tons/yr) Predicted by Current Emission Factors ¹	317.1	519.6	4.15	

¹Predicted emissions are for engines E001 through E004 **combined**.

Note that for engines E001 through E004, requested VOC emissions based on the new emission factors exceed the APEN de minimis level, therefore emission limits for VOC will be included in the revised permit.

The emission factors in the current permit are in g/hp-hr and the permit requires that emissions from E004 be estimated using hours of operation and the maximum horsepower. The Division assumes that the source would still prefer to use emission factors in units of g/hp-hr. The AP-42 emission factors were converted to g/hp-hr, using the design heat rate of the engine (7800 Btu/hp-hr, according to the revised form 2000-302 submitted with the modification application on February 2, 2006), in the following equation:

$$EF \text{ (g/hp-hr)} = \frac{EF \text{ (lb/MMBtu)} \times 453.6 \text{ g/lb} \times \text{design heat rate (Btu/hp-hr)}}{10^6 \text{ Btu/MMBtu}}$$

The following emission factors will be included in the permit for engine E004: NO_x – 14.4 g/hp-hr, CO – 1.97 g/hp-hr and VOC – 0.42 g/hp-hr.

According to the original Title V permit application submitted on December 30, 1994, Engines E001 through E003 began operation in 1976 (initial construction permit issued December 10, 1975) and engine E004 began operation in 1978. For sources that did not undergo a physical change or change in the method of operation but increase emissions solely due to a change in emission factors, the Division considers that the emissions from the emission units at the time the unit was installed are at the levels predicted by the new emission factors. With the emission factor changes, the facility would have been a major source for PSD review upon installation and operation of engines E001 through E003; however, the PSD rules in effect at that time (December 5,

1974 rules) only applied to listed sources and for PM and SO₂ emissions; therefore PSD review does not apply to these engines. Engine E004 began operation in 1978 and the PSD rules at that time (June 19, 1978 rules) only applied to modifications with emissions that exceeded the PSD threshold (250 tons/yr of any criteria pollutant). Therefore, since emissions from engine E004 do not exceed 250 tons/yr of any criteria pollutant, PSD review does not apply to engine E004.

The requirements to install non-selective catalysts and air fuel controllers (Conditions 1.5 and 2.4) were removed from the permit. These control requirements apply to 4-cycle rich burn engines and the source has demonstrated that the engines qualify for the lean burn engine exemption in Colorado Regulation No. 7, Section XVI.C.4).

As discussed above under the modeling section, the Division will include CIG's commitment to raise the stack heights for engines E001 through E006 by February 1, 2007. The commitment to increase the stack heights is schedule to reach compliance with the NO₂ NAAQS. Since the project will be completed within six months, no requirement to submit a status report will be required. The next responsible official certification submitted with the semi-annual monitoring and deviation report due after the deadline for completing the stack height revisions shall serve as the compliance indicator that the stack height changes have been completed by the specified date.

Other Modifications

In addition to the requested modifications made by the source, the Division used this opportunity to include changes to make the permit more consistent with recently issued permits, include comments made by EPA on other Operating Permits, as well as correct errors or omissions identified during inspections and/or discrepancies identified during review of this modification.

The Division has made the following revisions, based on recent internal permit processing decisions and EPA comments on other permits, to the Latigo Operating Permit with the source's requested modifications.

Section I – General Activities and Summary

- Revised Condition 1.1 to indicate that the 8-hr ozone control area is defined in Regulation No. 7, rather than citing the federal register.
- Revised the language in Condition 1.4 to reflect that only the last paragraph of Section IV, Condition 3.g is state-only and removed Section II, Conditions 1.5, 2.4 and 7 since they are no longer apply.
- Some of the citations in Condition 3.1 (PSD) were revised based on revisions made to Regulation No. 3.

Sections II.1 and 2 – Engines E001 thru E004

- These engines were previously identified as rich burn engines and by identifying these engines as lean burn engines, the source avoids the early action ozone compact requirements for engines in Regulation No. 7, Section XVI. Therefore, the Division is including a requirement to continuously monitor the percent oxygen in each engine exhaust to submit and application to modify their Title V permit to add the control requirements in Colorado Regulation No. 7, Section XVI if at any time the oxygen concentration in the engine exhaust is less than 2%.

In their October 19, 2006 comments on the draft permit, the source requested 60 days after permit issuance to install the monitoring device. The permit has been revised to include this request.

Sections II.1, 2 and 3 – Engines E001 thru E006

- Based on EPA's response to a petition on the Title V renewal permit for this facility, minor language changes were made to various permit conditions (both in the table and the text) to clarify that only natural gas is used as fuel in these engines.

Section II.4 – Glycol Dehydrator

- Revised Condition 4.1.3 to specifically state when GLYCalc has to be run.
- Based on comments received on the draft permit on October 19, 2006, the Division revised the comparison criteria (Condition 4.1) for the cold separator temperature from "at or below" to "at or above".
- The Division revised the ethylene glycol calculation method (Condition 4.1.4) to require that emissions be calculated based on actual hours of operation and the lbs/hr emission rate determined by the March 9, 2006 performance test.

Section II.6 – Condensate Truck Loading

- In order to be consistent with the Division's March 7, 2005 Condensate Tank Guidance, revised Condition 6.2.3 to require that the permittee sample the low pressure oil, rather than the high pressure oil.

Section II.7 – Early Action Ozone Requirements

- As discussed in the technical review document for the renewal permit, although this facility is located in the 8-hour ozone control area, only the requirements for stationary or portable reciprocating internal combustion engines applied. At the time the renewal application was processed engines E001 through E004 were identified as 4-cycle rich burn engines and each had rated horsepower over 500; therefore control provisions applied to these engines. Regulation No. 7, Section XVI included an exemption for existing lean burn engines if sources could demonstrate that the costs of controlling emissions would exceed \$ 5,000 per ton and submitted such demonstration by May 1, 2005 (Regulation No. 7, Section XVI.C.4). On April 29,

2005 the source submitted a demonstration indicating that engines E001 through E004 were lean burn engines and that the costs of control would exceed \$5,000 per ton. In a letter dated October 12, 2005, the Division agreed that the engines were lean burn engines and were exempt from the control requirements in Regulation No. 7, Section XVI, therefore, the early action ozone requirements are being removed from the permit.

Section IV – General Conditions

- Removed the statement in Condition 3.g (affirmative defense provisions) addressing EPA approval and state-only applicability. The EPA has approved the affirmative defense provisions, with one exception and the exception, which is state-only enforceable is identified in Section I, Condition 1.4.
- General Condition No. 21 (prompt deviation reporting) was revised to include the definition of prompt in 40 CFR Part 71.
- Replaced the phrase “enhanced monitoring” with “compliance assurance monitoring” in General Condition No. 22.d.

Appendices

- Revised the insignificant activity list in Appendix A to reflect the insignificant activities included in the modeling analysis.
- Appendix B and C were replaced with latest version. In the tables engines E001 – E004 were correctly identified as lean burn engines.
- Revised Appendix D to include the new address for EPA.

HAPS per Division Analysis

Unit	HAP Emissions (tons/yr)										total
	acetaldehyde	acrolein	benzene	toluene	ethyl benzene	xylene	formaldehyde	ethylene glycol	n-hexane	methanol	
E001	3.04E-01	2.06E-01	5.37E-02	2.78E-01		1.45E-02	1.61		4.04E-02	9.09E-02	2.60
E002	3.04E-01	2.06E-01	5.37E-02	2.78E-01		1.45E-02	1.61		4.04E-02	9.09E-02	2.60
E003	3.04E-01	2.06E-01	5.37E-02	2.78E-01		1.45E-02	1.61		4.04E-02	9.09E-02	2.60
E004	2.75E-01	1.86E-01	4.84E-02	2.50E-01		1.30E-02	1.45		3.65E-02	8.21E-02	2.34
E005	3.67E-02	3.46E-02	8.54E-02	2.74E-02		6.18E-03	0.38			4.02E-02	0.61
E006	3.67E-02	3.46E-02	8.54E-02	2.74E-02		6.18E-03	0.38			4.02E-02	0.61
Dehy			4.00	4.00	4.00	4.00		4.00	4.00		13.00
Fugitive VOCs			5.63E-04	6.66E-04	3.85E-04	3.85E-04			7.80E-03		0.01
Condensate Truck Loading			4.00E-03	4.00E-03	0.00E+01	2.00E-03			3.20E-02		0.04
Total	1.26	0.87	4.38	5.14	4.00	4.07	7.04	4.00	4.20	0.44	24.41

Engine emissions are based on most conservative emission factor (from AP-42 and HAPCalc 2.0, for 4-cycle rich burn and 4-cycle lean burn engines or performance test conducted July 2004 for engines E001 - E004) for each pollutant.

Dehy emissions based on permitted HAP emissions - 4 tons/yr individual HAP. Although Total HAPS are permitted at 14 tpy, this analysis only uses 13 tpy. This is because VOC emissions are limited to 9 tpy. All of the HAPS are VOCs, therefore, HAP emissions from the dehy are limited to 9 tpy based on the GLYCalc run and the VOC emission limit. However, ethylene glycol emissions are not predicted by GLYCalc, but are limited to 4 tpy. Therefore, total HAPS cannot exceed 9 + 4 = 13 tpy of HAPS. The 14 tpy total HAP limits is extraneous and cannot be reached without violating other permit limits.

Fugitive VOC emissions are based on permitted emission limits and the n-hexane, BTEX weight percent from wet gas analysis used in GLYCalc to set permit limits.

Since the renewal application indicates that the potential fugitive VOC emissions from leaks is much less than permitted VOC emissions, this is a conservative calculation.

Condensate truck loading HAP emissions are from flashing only, not actual unloading. Flash emissions from E & P tanks 2.0, unloading from AP-42